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THE Be-Ir (BERYLLIUM-IRIDIUM) SYSTEM

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Equilibrium Diagram

No phase diagram data are available. Two intermediate phases, (1) $\text{Be}_{17}\text{Ir}_2$ (10.5 at.% Ir) [71Ver] or Be_xIr ($x = 5$ to 20) [70Joh] and (2) Be_2Ir [36Mis], were reported. Be_xIr may be isotypic with Be_xRh [70Joh].

The melting point of βBe and the $\beta\text{Be} \rightarrow \alpha\text{Be}$ allotropic transformation temperature are 1289 ± 4 and 1270 ± 6 °C, respectively [85BAP]. The melting point of Ir is 2447 °C [81BAP].

[80Tan] predicted the existence of a stable or metastable phase, BeIr , having the CsCl-type crystal structure from the study of a series of Be-transition metal systems. However, since this system is still incomplete, it is possible that BeIr may be present as a stable phase as in the Be systems with Rh, Pd, and Pt, all neighbors of Ir in the periodic table [85Oka1, 85Oka2, 85Oka3].

Crystal Structures

A summary of crystal structure and lattice parameter data is given in Table 1.

The hexagonal lattice parameters of $\text{Be}_{17}\text{Ir}_2$ [71Ver] and of Be_xIr [70Joh] are nearly same but the structures differ in symmetry details, where both are derivative of the CaCu_5 prototype. The formula $\text{Be}_{6.6}\text{Ir}$ is due to partial occupancy of lattice sites, as determined with great accuracy in a single-crystal study of $\text{Be}_{6.6}\text{Rh}$ [70Joh]. These results are preferred over the powder XRD examination of [71Ver].

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* Indicates key paper.

Table 1 Be-Ir Crystal Structure and Lattice Parameter Data

Phase	Composition, at.% Ir	Struktur- Pearson bericht		Space group	Proto- type	Lattice parameters, nm		Reference
		symbol	designation			a	c	
(β Be)....	0	cI2	A2	Im3m	W	0.25515	...	[82Kin]
(α Be)....	0	hP2	A3	P6 ₃ /mmc	Mg	0.22857	0.35839	[81Kin]
Be ₂ Ir(a)	?	(hexagonal)	(b)	P6 ₃ m2	...	0.4197	1.0842	[70Joh]
Be ₁₇ Ir ₂ ...	10.5	(hexagonal)		P6/mm	...	0.4193	1.089	[71Ver]
Be ₂ Ir....	33.3	(c)	?	?	?	?	?	[36Mis]
BeIr(d)...	50	cP2	B2	Pm3m	CsCl	?	...	[80Tan]
(Ir).....	100	cF4	A1	Fm3m	Cu	0.38391	...	[81Kin]

(a) $x = 5$ to 20. (b) Closely related to D2₃. (c) Complex. Similar to Be₂Rh. (d) Predicted.

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